

Crop Growth Zone Detection

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<div><div><div>< 15% less</div><div>5-15% less</div><div>+ 5% average</div><div>5 - 15 % better</div><div>> 15 % better</div></div></div> <div>Historical crop growth zone detection based on 5 years of Sentinel-2 data for a parcel in Belgium (Source: VITO, watchitgrow.be)</div>				
Category				
<input checked="" type="checkbox"/> Product Development	<input checked="" type="checkbox"/> Product Sales	<input checked="" type="checkbox"/> Underwriting	<input checked="" type="checkbox"/> Loss Adjustment	<input checked="" type="checkbox"/> Claims Handling
PRODUCT DESCRIPTION				
<p>A crop parcel is mostly uniformly treated by farmers and local weather conditions. Many fields however show a spatial variability in crop performance in the course of the growing season. Such variability is caused by a variety of natural and technology factors.</p> <p>Where a multiyear recurrent variability is caused by differences in soil types, topography, weather micro-zones, crop growing technologies applied by the farmer, level of precipitation and irrigation access, while more abrupt and unexpected field variability could be caused by extreme weather events (e.g.: hail, storm, flood, drought, etc.).</p> <p>Availability of crop growth zones is important for all stages of insurance product cycle, while the highest importance of such information is for agricultural underwriting and loss adjustment.</p>				
PRODUCT SPECIFICATIONS				
Main processing steps				
Satellite information derived from Sentinel-2 can support the evaluation of historical natural field variability as compared to the near real time detection of less/better performing zones within crop parcels.				
Input data sources				
<p><u>Optical</u>: Sentinel-2</p> <p><u>Radar</u>: n.a.</p> <p><u>Supporting data</u>: for development: field yield samples</p>				
Spatial resolution and coverage				
<p><u>Spatial resolution</u>: 10 m</p> <p><u>Coverage</u>: crop parcel</p> <p><u>Availability</u>: On demand</p>				
Accuracy / constraints				
<p><u>Thematic accuracy</u>: The maps do not represent a physical quantity hence only a qualitative assessment is possible, e.g. by relating the maps with intra-field yield variability, detailed soil maps or crop damage maps. It is advised to perform an assessment with the service provider on a study area to evaluate the quality of the maps for a specific usage and region.</p> <p><u>Spatial accuracy</u>: See Thematic accuracy.</p>				
Limitations				
<p>Challenging to detect the underlying processes of the intra-field variability: e.g. soil, agricultural management, crop damage.</p> <p>Ancillary information on weather conditions and crop type are required to interpret the detected crop growth zones.</p>				
Frequency / timeliness				
<p><u>Frequency</u>: static maps or updated regularly (+- weekly)</p> <p><u>Timeliness</u>: historical data or < 2 weeks</p>				
Delivery / output format				
<p><u>Data type</u>: raster, vector</p> <p><u>File format</u>: GeoTIFF, Shapefile</p>				

Accessibility

Available on demand from EO service providers.

CHALLENGES ADDRESSED - USE CASE(S)

Product Development:

- [Index insurance: Risk / crop modelling](#) (Correlation of EO data with in-situ data)
- [Index insurance: Relation between weather and impact on crop productivity](#)
- [Index insurance: Platform for crop health products](#)
- [Elaboration of crop profile: Field crops, vegetables](#)
- [Information on forest health and production at different temporal scales](#) (realtime monitoring, historical development)
- [Radar data](#) (eliminated cloud cover effects)
- [Risk exposure](#) (product design and customer communication)
- Crop growth status during the pre-winter vegetation season of winter crops
- Benchmark for anomaly indication of abnormal natural occurrence of crop growth

Product Sales

- [Client Outreach](#)
- [Pre-contractual Consulting](#) (show-case risk exposure)
- [Greater acceptance of index covers by farmers](#)
- [Regular market penetration review](#)
- [Risk alerts](#)

Underwriting:

- [Seasonal portfolio monitoring](#)
- [Online platforms or easy-to-use interfaces integrating various data sources](#) (vegetation stress, field boundary changes, comparison)
- [Risk / crop zoning](#)
- [Actual crop health \(vegetation\)](#)
- [Global/Regional production trends](#) (e.g. monitoring specific crop acreages of surrounding regions/countries)
- [Procure better reinsurance terms/capacity from enhanced insurance practice](#)
- [Crop calendar and practices](#)
- [Regular assessment of risk pricing and product rating](#)

Loss Adjustment:

- [Workforce allocation and planning](#)
- [Benchmark physical field observations against yield loss detection](#) (e.g. product calibration)
- [Risk mapping against crop's vegetation stages](#)
- [Increase credibility of loss adjustment](#) (e.g. show EO data/visualization to support loss adjustment communication to farmer)
- [Enhance field survey \(better precision with EO data support\)](#)
- [Detect crop damage at field level](#)
- [Assess crop damage at field level](#)
- [Distinct field heterogeneity with crop damage](#)

Claims Handling:

- [Identification of actual damage size \(tons \(volume\) / ha \(area\) / price \(yield value\)\)](#)
- [Quality control assessment of claims before pay-out](#)
- [Fraud detection](#)
- [Obtaining timely, reliable and consistent data to speed-up the indemnity pay-outs](#)